GP 2508

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Rhonda M. Grant

Docket: 0756-958

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT application of)
Shunpei YAMAZAKI et al.)
Serial No. 08/183,800) Art Unit: 2508
Filed: January 21, 1994) Examiner: M. Saadat
For: SEMICONDUCTOR MATERIAL)
AND METHOD FOR FORMING)
THE SAME AND THIN FILM)
TRANSISTOR) Date: August 12, 1994

Attach

#18

8/25/94

SUPPLEMENTAL RESPONSE

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Supplemental to the Amendment filed August 8, 1994, it is noted that elaboration of the remarks of the foregoing amendment may be helpful in enabling the Examiner to understand the difference between the invention of claims 23-28 and the '044 reference. Thus, referring to page 8, second paragraph of the foregoing amendment, it is stated that "Hence, the channel region 2 may be pure amorphous where there is no Raman peak and thus no Raman shift can be detected." In particular, since channel region 2 of '044 may be amorphous, at least this amorphous phase has no Raman Peak (or shift) at a wavenumber of 512 cm^{-1} or higher, as recited in claim 23.

In this regard, it should be noted that, as stated in the paragraph

bridging pages 4 and 5 of the specification, the Raman Peak for single crystal silicon is 521 cm^{-1}. Thus, if a semiconductor shows a Raman Peak (or shift) at a number of 512 cm^{-1} or higher with respect to the single crystal wavenumber of 521 cm^{-1}, the degree of crystallinity thereof will be high and clearly greater than the very broad Raman Peak which occurs at 480 cm^{-1} for amorphous silicon. To further illustrate this, attached hereto as Appendix I is a copy of a Raman spectrogram for amorphous silicon and single crystalline silicon. As can be seen, the peak for single crystalline silicon occurs at 521 cm^{-1} while a very broad peak occurs at 480 cm^{-1} for amorphous silicon.

Furthermore, again referring to page 8, second paragraph of the remarks of the Amendment filed August 8, 1994, it is stated "However, in the present invention, the degree of crystallinity in combination with the low concentration percentage of carbon, nitrogen or oxygen must be such that a Raman Peak is present and thus the non-single-crystalline material of the present invention excludes at least the pure amorphous phase of the '044 semiconductor region 2." As stated above and illustrated in Appendix I, the amorphous phase of the '044 channel region 2 does exhibit a very broad peak at around 480 cm^{-1}. However, there is no peak (or shift) for this amorphous phase between the wavenumbers 521 cm^{-1} and 512cm^{-1}. Hence, as stated in the last sentence of the foregoing paragraph on page 8 of the Amendment of August 8, 1994, the permitted range in crystallinity in claims 23, 25 and 27 is possibly included within the broad range of crystallinity of the channel region in '044; however, the range of crystallinity (Raman shift wavenumbers between 521 cm^{-1} and 512 cm^{-1} in claim 23) in the present invention is so selected that the desired electron mobilities of the present invention are obtained.

With the foregoing elaboration, it is again submitted that the claims

of the subject application are patentably distinguishable with respect to the '044 reference.

Respectfully submitted,

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